Exhibit 8

2634 41

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:   09/850,124

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Applicant: Krishna BALACHANDRAN et al.

Group Art Unit: 2634

Examiner: Eva Y. Zheng

Title: ENHANCED FREQUENCY HOPPING IN A WIRELESS SYSTEM

Attorney Docket: 29250-000873/US

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 16, 2004

AMENDMENT

Sir:

Applicants are in receipt of the Office Action dated May 20, 2004 ("Office Action"), and respond as follows.

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 9 of this paper.

IN THE CLAIMS

Kindly amend claims 1, 3, 5, 6, 8, 10, 15, 17, 19, 21, 24 and 26 and delete claims 2, 4, 7, 11, 18, 20, 23 and 27 without prejudice to, or disclaimer of, the subject matter therein. The subject matter of these deleted claims has been incorporated into other claims.

The following is a complete listing of revised claims with a status identifier in parenthesis.

LISTING OF CLAIMS

1.   (Currently Amended)   A method for use in wireless equipment, the method comprising the steps of:

transmitting signals using frequency hopping over a time period T, by

pseudorandomly selecting a frequency from a set of N frequencies such that over at least a portion of the time period T, the frequency selection is constrained to less than the N frequencies.

2.   (Cancelled)

3.   (Currently Amended)   A method of frequency hopping for use in wireless equipment, the method comprising the steps of:

storing a set of hopping frequencies; and

pseudorandomly selecting frequencies from the set of hopping frequencies over a time period T by limiting the available frequencies from the hopping set over at least a portion of the time period T.

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4.   (Cancelled)

5.   (Currently Amended)   A method of frequency hopping for use in wireless equipment, the method comprising the steps of:

initializing a hopping set to a size of F frequencies, the hopping set used to <u>pseudorandomly</u> select therefrom hopping frequencies over a time period T; and

reducing the size of the hopping set over a portion of the time period T by at least one frequency.

6.   (Currently Amended)   A method of frequency hopping for use in wireless equipment, the method comprising the steps of:

initializing a hopping set to a size of N frequencies, the hopping set used to select therefrom hopping frequencies over a time period T; and

<u>pseudorandomly</u> selecting frequencies from the hopping set over the time period T such that at least one of the selected frequencies is prohibited from subsequent selection in at least a portion of the time period T.

7.   (Cancelled)

8.   (Currently Amended)   A method of frequency hopping for use in wireless equipment, where a hopping set is initialized to a size of N frequencies, the hopping set used to select therefrom hopping frequencies over a time period T, the method comprising the steps of:

determining a hopping index value;

modifying the hopping index value by at least the modulo of a number F, where $F \leq N$;

pseudorandomly selecting a hopping frequency from the hopping set of a function of the modified hopping index value;

adjusting the order of the hopping set such that the selected hopping frequency is now at a position corresponding to the value of F;

reducing the value of F; and

returning to the determining step.

9.   (Original)   The method of claim 8 wherein the value of F reaches a predefined minimum value, further including the step of shifting the hopping set in a cyclical direction by a value equal to a difference between a predefined maximum value for F and the minimum value, modulo N.

10.   (Currently Amended)   A method for frequency hopping for use in wireless equipment, the method comprising the steps of:

initializing a hopping set to a size of N frequencies, the hopping set used to select therefrom hopping frequencies over a time period T;

dividing the hopping set into an allowable frequency set and a prohibited frequency set;

pseudorandomly selecting frequencies from the allowable frequency set; and

after at least one frequency selection, adjusting the membership in the allowable frequency set and the prohibited frequency set.

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11.   (Cancelled)

12.   (Original)   The method of claim 10 wherein membership in the allowable frequency set and the prohibited frequency set at a current time is derived from knowledge of the allowable frequency set and the prohibited frequency set at an earlier time.

13.   (Original)   The method of claim 10 wherein knowledge of the allowable frequency set and the prohibited frequency set at a particular time is provided by one wireless endpoint to the other wireless endpoint through explicit signaling.

14.   (Original)   The method of claim 10 wherein all N frequencies in the hopping set are assumed allowable at pre-determined time instants.

15.   (Currently Amended)   A ~~method of~~ pseudorandom frequency hopping <u>method</u> for use in wireless equipment, the method comprising the steps of:

dividing a hopping set into an allowable frequency set and a prohibited frequency set; and

transmitting information associated with the division of the hopping set to another wireless endpoint.

16.   (Original)   The method of claim 15 wherein the transmitted information enables the other wireless endpoint to derive the allowable frequency set.

17.   (Currently Amended)   A wireless endpoint comprising:

a transmitter for transmitting signals using frequency hopping over a time period T; and

a processor for <u>pseudorandomly</u> selecting a frequency from a set of N frequencies such that over at least a portion of the time period T, the frequency selection is constrained to less than the N frequencies.

18.   (Cancelled)

19.   (Currently Amended)   A wireless endpoint comprising:

a memory for storing a set of hopping frequencies; and

a processor for <u>pseudorandomly</u> selecting frequencies from the set of hopping frequencies over a time period T by limiting the available frequencies from the hopping set over at least a portion of the time period T.

20.   (Cancelled)

21.   (Currently Amended)   A wireless endpoint comprising:

a memory for storing a hopping set comprising F frequencies, the hopping set used to <u>pseudorandomly</u> select therefrom hopping frequencies over a time period T; and

a processor for reducing the size of the hopping set over a portion of the time period T by at least one frequency.

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22.   (Currently Amended)   A wireless endpoint comprising:

a memory for storing a hopping set comprising N frequencies, the hopping set used to select therefrom hopping frequencies over a time period T; and

a processor for <u>pseudorandomly</u> selecting frequencies from the hopping set over a time period T such that at least one of the selected frequencies is prohibited from subsequent selection in at least a portion of the time period T.

23.   (Cancelled)

24.   (Currently Amended)   A wireless endpoint comprising:

a memory for storing a hopping set comprising N frequencies, the hopping set used to <u>pseudorandomly</u> select therefrom hopping frequencies over a time period T; and

a processor for (a) determining a hopping index value, (b) modifying the hopping index value by at least the modulo of a number F where $F \leq N$, (c) selecting a hopping frequency from the hopping set as a function of the modified hopping index value, (d) adjusting the order of the hopping set such that the selected hopping frequency is now at a position corresponding to the value of F, (e) reducing the value of F; and (f) returning to (a).

25.   (Original)   The wireless endpoint of claim 24 wherein when the value of F reaches a predefined minimum value, the processor further shifts

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the hopping set in a cyclical direction by a value equal to a difference between a predefined maximum value for F and the minimum value, modulo N.

26.   (Currently Amended)   A wireless endpoint comprising:

a memory for storing a hopping set comprising N frequencies, the hopping set used to select therefrom hopping frequencies over a time period T; and

a processor for (a) dividing the hopping set into an allowable frequency set and a prohibited frequency set, (b) pseudorandomly selecting frequencies from the allowable frequency set, and (c) after at least one frequency selection, adjusting the membership in the allowable frequency set and the prohibited frequency set.

27.   (Cancelled)

REMARKS

Response to Claim Rejections

The Office Action requests that the reference to "N" frequencies in claims 6 and 10 be changed to "F" frequencies. As indicated on at least page 5 of the specification, N is the total number of frequencies available for frequency hopping, while F is the number of frequencies in a hopping state, **H**, over which a wireless endpoint is constrained to hop, where F is less than or equal to N. Therefore, Applicants respectfully submit that claims 6 and 10 appropriately indicate an initial hopping set of size N frequencies.

The Office Action also requests that claims 22, 24 and 26, which claim "a memory for storing a hopping set comprising N frequencies" should be changed to --a memory for storing a hopping set comprising F frequencies--. Similar to the objections to claims 6 and 10, Applicants respectfully submit that the present specification provides support for existing claims 22, 24 and 26.

Accordingly, Applicants respectfully request withdrawal of the pending objections and allowance of claims 6, 10, 22, 24 and 26.

The Section 112 Rejections

Claim 9 was rejected under 35 U.S.C. §112, the Office Action stating that the feature "the step of shifting" in claim 9, line 2, requires an antecedent basis. Applicants respectfully traverse this rejection for at least the following reasons.

As presently understood by Applicants' attorney, the Office Action appears to be objecting to the form of claim 9. However, it is respectfully submitted that when an additional step or method is claimed, the format "the step of" is appropriate and does not require an additional antecedent basis, e.g., "a" or "an"preceding step.

In addition, it is respectfully submitted that the scope of claim 9 can be reasonably ascertained by those skilled in the art and, therefore, is not indefinite (see MPEP 2173.05(e)).

Accordingly, Applicants respectfully request withdrawal of the pending rejection and allowance of claim 9.

Section 102 and 103 Rejections

Claims 1, 3, 5, 6, 8-10, 12-17, 19, 21, 22 and 24-26 were rejected under 35 U.S.C. §102(b) as being anticipated by Kung et al., U.S. Patent No. 4,654,859 ("Kung"). In addition, claims 1, 3, 5, 6, 10, 15, 17, 19, 21, 22, 24 and 26 were rejected under 35 U.S.C. §102(b) as being anticipated by Emi, U.S. Patent No. 5,541,954 ("Emi"). Finally, claims 2, 4, 7, 11, 18, 20, 23 and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kung.

Applicants respectfully disagree and traverse these rejections for at least the following reasons.

As indicated in the Office Action, neither Kung nor Emi discloses or suggests the pseudorandom selection of a hopping frequency, as is required by each of the claims of the present invention. In fact, both references teach away from the use of a pseudorandom selection of a hopping frequency.

Kung selects a frequency by cycling through an ordered frequency set in a predetermined fashion. In contrast, the present invention pseudo-randomly selects a hopping frequency. The fact that Kung discloses the selection of a frequency by cycling through an ordered frequency set in a predetermined fashion, explicitly teaches away from pseudorandom selection of a hopping frequency, as is required by the claims of the present invention.

Emi appears to disclose a frequency hopping scheme where a receiver counts errors it has received on each given frequency. If a total error count exceeds some metric, then the received frequency will be deemed unusable and an alternative, unused frequency will be substituted in its place. There is nothing in Emi which teaches the pseudorandom selection of a hopping frequency, as is required by the claims of the present invention. One of ordinary skill in the art, on reading Emi would not equate Emi's substitution of a new frequency with pseudorandom frequency hopping selection, as is required by the claims of the present invention.

In the Office Action, it is stated that "it is well known in the art that a frequency hopping spread spectrum carrier hops on a predetermined pseudo

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random pattern." Applicants wish to respectfully point out at least two things regarding this statement in the Office Action.

First, the claims do not require "a predetermined pseudorandom pattern." Instead, all that is required is a pseudorandom selection of a hopping frequency.

Second, Applicants respectfully submit that this is an inappropriate basis for rejecting the claims based on 35 U.S.C. §103(a). Only in limited circumstances should claims be rejected based on "common knowledge." Such a rejection, unsupported by documentary evidence should only be taken when the facts asserted to be common knowledge in the art are capable of instant and unquestionable demonstration of being so known.

Applicants respectfully submit that the pseudorandom selection of a hopping frequency from a set of N or F frequencies is not capable of instant and unquestionable demonstration as being well known, given the fact that none of the references cited in the Office Action discloses or even suggests such a feature.

Because there is no form of evidence offered in the Office Action to support an assertion of common knowledge or specific factual findings predicated on sound technical and scientific reason to support the rejection, Applicants respectfully request that the Section 103 rejections be withdrawn and claims 3, 4, 7, 11, 18, 20, 23 and 27 be allowed (see MPEP 2144.03).

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John E. Curtin at the telephone number of the undersigned below.
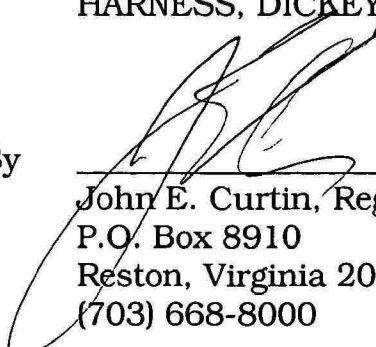
In the event this Response does not place the present application in condition for allowance, applicant requests the Examiner to contact the undersigned at (703) 668-8000 to schedule a personal interview.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By   _____

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